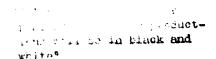


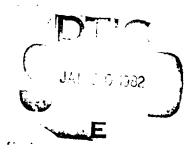


SUSQUEHANNA RIVER BASIN

## **ALEXANDER LAKE DAM**

TIOGA COUNTY, NEW YORK
INVENTORY NO. N.Y. 936







PREPARED FOR

NEW YORK DISTRICT CORPS OF ENGINEERS
JULY 1981

APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION UNLIMITED

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observed conditions are not consistent to significantly affect the overall performance of the dam at this time.

The owner's representative reported that the low level outlet pipe for the embankment was plugged by concrete prior to the filling of the dam, as required by the design drawings. Therefore, the dam has no functional low level outlet facilities that could draw down the reservoir in the event of an emergency.

The spillway capacity was evaluated according to the recommended procedure and was found to pass 80 percent of the Probable Maximum Flood (PMF) without overtopping the dam and full PMF with a winor evertopping of the embankment. The spillway capacity of the dam is rated to be inadequate because the spillway cannot pass the recommended spillway design flood of full PMF without overtopping the dam.

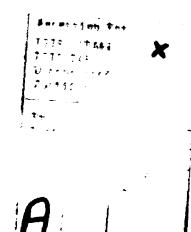
## PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Bane, for Phase I Investigations. Service of those guidelines may be obtained from the Office of Chief of Engineers, Machington, B.C. 2031b. The purpose of a Phase I Investigation is to identify expeditiously those date which may pose baserie to human life or property. The assessment of the general condition of the date is based upon available date and visual inspections. Betailed investigation and analyses involving topographic expense, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

in reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lawared or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating contraspect of the structure.

It is important to note that the condition of a dan depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dan will continue '- represent the condition of the dan at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued core and maintenance can those conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rurity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as accessarily posing a highly inadequate condition. The test flood provides a accourse of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.



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## Assessment - Alexander Lake Dan

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### SETTION : PROJECT INFORMATION

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#### LOCALION

The dam is located on an unnamed tributary of the East Branch of Owega Creek about one mile west of Nevark Valley in Tioga County, New York. Place I illustrates the location of the dam.

#### Size Classification

The dan is classified as a small dam based on 12-foot height and a maximum storage capacity of 158 acre-feet.

#### Masard Classification

The dam is classified to be in the high hazard category. Approximetely one mile downstream from the dam, the stream flows through a rusal residential area. At least five houses are considered to be within the potential floodplain of the stream.

It is estimated that a failure of the dam would cause loss of more than a few lives and appreciable property damage in this area.

m. Ownership
The dam is sumed and operated by Newark Valley Central School District, Mouses Valley, M.Y. 31811, (604) 642-3221.

## Purpose of Dam loc reat ion

## Design and Construction History

the dam was designed by Mr. Howard Ward, Consulting Engineer, from Candor, New York, in 1965. The dam was constructed under a state connectuation permit application dated May 7, 1965.

## Sormal Operating Procedure

The reservoir is normally maintained at the crest level of the unionitabled primary spillway at Elevation 1263. The emergency epithwey error is located at Elevation 1264.8.

#### E PERTINENT DATA

Signations referred to in subsequent sections of the report were raiseleted based on field peasurements assuming the primary spillvey grave level to be at Elevation 1263 (USGS Datum) which was intersurjugant from the MMCS 7.5-minute Newark Valley Court quadrangle as the normal pool level for the lake. Elevations shown in design beguings govern to be relative to an arbitrary site datum.

#### a. Drainage Atea (acres)

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<sup>\*</sup> Plantage about from TSCS topportuphic bab.

h Discharge at Dem (afa)	
b. Discharge at Dam (cfs)  Principal spillway at top of dam	5(estimated)
Auxiliary spillway at top of dam	1032
Total spillway capacity at top of dam	1037
total spiritary capacity at top of dam	1037
c. Elevation (USGS Datum) (feet)	
Top of dam	1267.6
Auxiliary spillway crest	1264.8
Principal spillway crest	1263.0
• •	
d. Reservoir (acres)	
Surface area at top of dam	21.1
Surface area at creat of auxiliary spillway	20.0
Surface area at crest of principal spillway	19.3
e. Storage Capacity (acre-feet)	
Top of data	158
Auxiliary spillway crest	108
Principal apillway creat	65
f. Dem	
Type	Earth embankment
Leagth	450 feet
Height	12 feet
Top width	9 feet
Side slopes	Downstream: 3H: 1V
	Upstream: 3H: 1V
Zoning	No
Impervious core	No
Cutoff	Yes
Growt cuftain	No
Antonov Antillian	
g. Primary Spillway	3-foot-diameter
Type	corrugated metal pipe
	drop inlet
A = -A#	9-foot perimeter
Length	1263
Crest elevation	1203
h. Emergency Spillway	
Type	Vegetated trapezoidal
t y pre	earth channel
Length	60 feet (as measured)
Crest elevation	1264.8
DICSE RECENTED	

i. Reservoit Drain
The das has no functional reservoir drain facility.

#### SECTION 2: ENGINEERING DATA

#### 2.1 DATA AVAILABLE

Available information was obtained from New York State Department of Environmental Conservation, Dam Safety Division files. Available information consists of three design drawings. No other information or reference to such information was located. Mr. Donald Alexander, the owner's representative, was interviewed to obtain additional information on the design and construction of the dam.

#### 2.2 GEOLOGY

The Alexander Lake Dam is located in the glaciated Allegheny Plateau section of the Appalachian Plateau Province. This section is characterized as a maturely dissected plateau with the features modified by continental glaciation, including deposition of glacial till in the valleys.

The dam site is near the axis of a northeast trending anticline (approximately north 70 degrees east). The folding is gentle with the maximum dip of the limbs one to two degrees. The strata at the dam are nearly horizontal and the dip of the strata are affected locally by the folding; however, regionally, the rock strata dip south to southwest at approximately 100 to 150 feet per mile. Regional discontinuities trend approximately east-west and north-east.

The rock strata in the area consist of unconsolidated Pleistocene glacial till (Wisconsin Drift) underlain by strata of the Lower West Falls Group (Upper Devonian Age). The glacial till consists of a mixture of clay and silt with varying amounts of gravel. The glacial till is relatively thin on hilltops and slopes and thicker in the valleys. The bedrock consists of the Gardeau Formation and the Rorich Glen Shale, a thick sequence of interbedded very dark gray shale and thin siltstone.

The abutment slopes are relatively gentle and not susceptible to landslide slope movement.

## 2.3 SUBSURFACE INVESTIGATION

No reference was found to indicate a subsurface investigation was conducted in conjunction with the design of the dam. A note included on the design drawing shown in Plate 2 suggests that some test pits may have been excavated to classify the soils in the area.

### 2.4 EMBANKMENT AND APPURTENANT STRUCTURES

Place 2 illustrates the typical cross section of the dam. The dam appears to consist of homogeneous fill with a central cutoff

trench. The dam was designed to have a slope of 2 horizontal to 1 vertical downstream and 3 horizontal to 1 vertical upstream. The valley cross section of the dam is included in Plate 3.

The appurtenant structures include a drop inlet primary spillway and open-channel emergency spillway located on the left abutment. Details of the primary spillway are illustrated in Plate 2.

#### 2.5 CONSTRUCTION RECORDS

No records are available on the construction of the dam. According to the owner's representative, the dam was constructed under the supervision of the design engineer.

#### 2.6 OPERATING RECORDS

No operating records are maintained for the dam. The dam is maintained by the owner's personnel.

#### 2.7 EVALUATION OF DATA

The available information does not provide any quantitative data for the assessment of structural, geotechnical and hydraulic features of the dam. The design drawings indicate the low level and primary spillway outlet pipes consist of metal pipes. Because metal pipes are subject to corrosion and failure of one of these pipes may cause distress in the embankment, concern exists as to the structural condition of the facilities. Therefore, the owner should evaluate the structural adequacy of the facilities.

The available information includes no hydrology and hydraulic analysis. Plate 4 shows the design maximum pool level. In the construction permit application to the state, the design capacity of the spillway is noted to be 454 cfs.

#### SECTION 3: VISUAL INSPECTION

#### 3.1 FINDINGS

#### a. General

Visual inspections of Alexander Lake Dam were conducted on March 27 and April 30, 1981. The pool level on the dates of inspection was approximately at the primary spillway level.

#### b. Embankment

In general, the condition of the dam is considered to be fair. Field observations are illustrated in Plate 5. Two wet areas were observed along the downstream toe of the dam. No seepage flow appeared to be associated with the wet areas. A minor seepage was located on the downstream toe in an area which appeared to be the discharge channel of the low level outlet facility. The upstream slope shoreline was found to be irregular and lacked erosion protection. However, no significant erosion due to wave action was noted.

The dam crest was surveyed relative to the primary spillway crest elevation and was found to have some vertical irregularities. While the design freeboard for the dam is 4 feet, the field survey indicated freeboard ranging from 4.3 to 5.8 feet. The lowest area is at the center of the embankment. The dam crest profile according to field measurements is illustrated in Plate 6.

#### c. Primary Spillway

The primary spillway consists of a 3-foot-diameter corrugated metal pipe drop inlet structure which discharges into a 24-inch metal pipe terminating at the downstream toe of the dam. Although visible portions of the primary spillway facilities were found to be in good condition, concern exists as to the condition of the metal pipe through the embankment.

#### d. Emergency Spillway

The emergency spillway is a trapezoidal vegetated earth channel located on the left abutment. The emergency spillway channel was found to be in good condition. The grass cover is well established and adequately maintained. The approach and discharge channel were found to be free of brush and trees or debris which might pose a potential for blockage of the spillway.

#### e. Reservoir Drain

The dam does not have a functional reservoir drain pipe. The owner's representative indicated that the upstream end of the reservoir drain pipe was plugged with concrete prior to the filling of the dam.

f. Downstream Channel

Downstream channel below the primary spillway outlet pipe is an unprotected earth channel which flows parallel to the coe of the dan for approximately 100 feet and then joins the natural streambed. The channel appears to be stable in the near vicinity of the dan.

Reservoir

And the reservoir slopes are gentle and no sign of instability was observed.

#### 3.2 EVALUATION

The overall condition of the dam is considered to be fair. The following conditions were observed which require action by the

- 1. The condition and structural adequacy of the spillway outlet pipe and reservoir drain pipe should be evaluated by the owner.
- 2. The crest of the dam should be surveyed and low spots filled to provide a uniform dan crest level.
- 3. The upstream face of the dam should be reshaped and the need for providing erosion protection should be evaluated. The wet areas and the seepage point below the toe of the dam should be periodically observed to document if significant seepage is developing.

## SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

## 4.1 PROCEDURES

The reservoir is normally maintained at the primary spillway creat level with excess inflow discharging through the primary spillway. The day has no formal operating precedure.

## 4.2 MAINTENANCE OF THE BAN

The dam is maintained by the owner's personnel. The croot and upotream and downstream faces of the dam and the emergency spilliney are covered with grass and were found to be edequately maintained.

## 4.) MARNING SYSTEM IN EFFECT

No formal warning system exists for the dam.

#### 4.4 EVALUATION

The maintenance condition of the dam is considered to be fair. The development of a formal warning system is considered to be advisable. Further, in view of a lack of a functional low level outlet facility to drain the lake in the event of an emergency, it is recommended that the owner should develop plans to draw down the reservoir in the event an emergency.

## SECTION 5. PROBABLIC/PROBBLOCK

## 1.1 MAINGE AND CHARGETERISTICS

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#### 5.1 MOLISIS CRITERIA

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The PP inflow for the reservoir ups between using the SEB splety service of the MEC=1 computer program beveloped by the Mydrategic Engineering Contex of the 1' 5 Arms Cospe of Engineers. The data used for the computer input are presented in Appendix 3. The PP inflow bedrapped ups Round to have a peak flow of 1790 of a Computer and puts are also included in Appendix 3.

### 1.1 SPILLINGS CAPACITY

The spillury facilities for the San connict of primary and emergency spilleges. The energency spillegy is a trapscribel earth channel with a base width of 60 feet and side elepto of 3 harisants! to I vertical on the abutant side and about 8 horizontal to 3 vertical an the appendicted side. The primary emillant is a 30-inch-fiameter corrupated actal riser discharging into a 26-inch corrupated actal pipe. The PT inflow hydrograph was routed through the reservois and it was found that the day can pass 90 percent of the PIP without evertapping the law spots as the crest of the Sas. Secouse the capacity of the primary spillous is negligible compared to the emergency spillows, anly the emergency spillows capacity was used in the calculations. For full PIP, it was found the law spots on the etest of the day would be prettopped for 1.1 hours with a national depth of about 0.2 faut. Dased on the available head relative to the law spot an the crest of the dab, capacity of the exergency spillors ous calculated to be 1032 cfs. Mergency spillory rating calculations are also included in Appendix 3.

## 5.4 MINERODIR CAPACITY

The dan impounds a reservoir with a storage capacity of 65 acrefeet at the primary spilloup crest level, 100 acrefeet at the emergency spilloup crest level, and 150 acrefeet at the level of the law spot on the crest of the dan.

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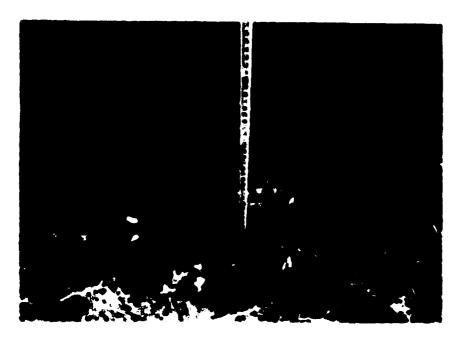
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PROTOCRAPH NO. 5
Primary Spillway Intake Structure



PNOTOGRAPH NO. 6 Primary Spillway Discharge Pipe



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PROTOCOUPR No. 8
Remotreum Residential Area
(approximately 1.0 mile downstreum)

APPENDIX A
VISUAL INSPECTION CHECKLIST

## APPENDIX 8 VISUAL INSPECTION ONEORLIST

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	Name of Dam <u>Alexander Late Dam</u>
	Fee: 1.0. # 8.1. 936 850 No. 964-3397
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	Stream Summer (Suppose)
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APPENDIZ E PLATES

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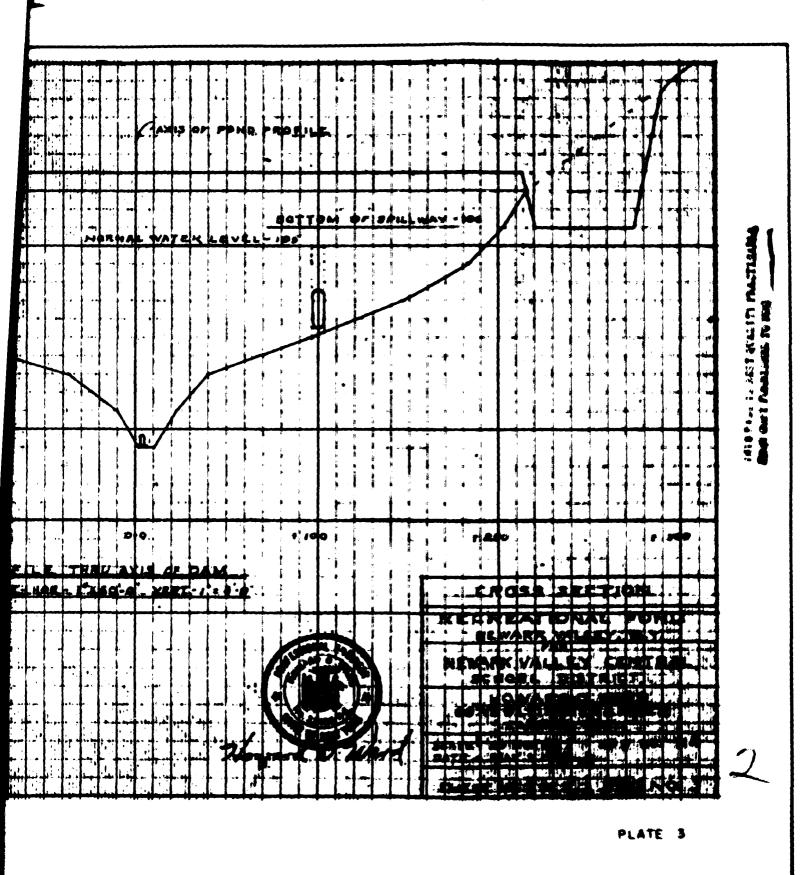
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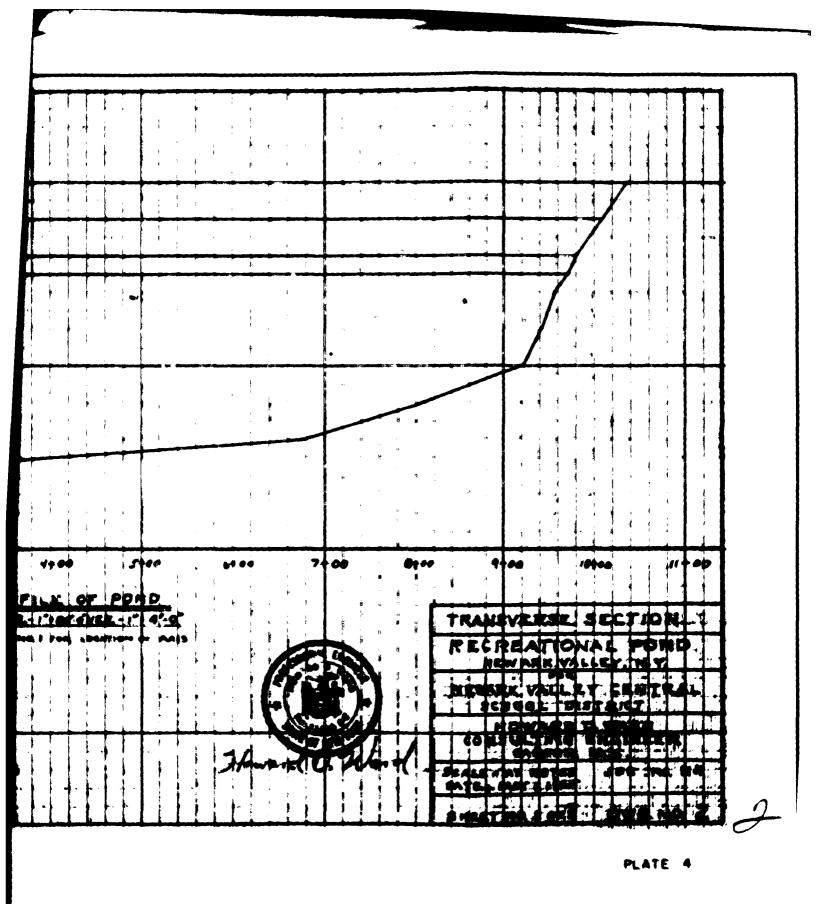


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GENERAL PLAN
FIELD INSPECTION NOTES
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APPENDIX F

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Beebe Loke Dom Jennings Pond Dam Nanticoke Creek Watershed Project Floodwater Retarding Dam Site 9-C Alexander Lake Dam Nanticoke Creek Watershed Project Floodwater Refording Dam Site 7-8 Pelto Dom Ed Pylkas Dam GEOLOGY MAP REFERENCE
SECLOGIC MAP OF NEW YORK, PINGER LAKES SHEET DATED 1970, SCALE +: 250,000 DAPPOLONIA

### **LEGEND**

## CAMADAMINY GROUP 800 1200 N. (240-370 m.)

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## JAMA GROUP 300-700 R. (50-210 m.)

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## WEST FALLS GROUP 1100-1000 ft (340-490 m.)

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# SORYEA GROUP 200-1000 R (80-300 m.)

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# GENESEE GROUP AND THLLY LINESTONE 280-1600 N (80-300 m.)

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GEOLOGY MAP LEGEND

REFERENCE SECLOGIC MAP OF NEW YORK, FINGER LAKES SHEET DATED: 1970, SCALE 1: 290,000

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